REMARKS

The Office Action rejected claims 1-9 and 21-26 under 35 U.S.C. 102(e) as being anticipated by Miller et al. (U.S. Patent No. 6,226,418, hereinafter Miller). The Office Action objected to claims 10-20 and 27-30 but stated that these claims would be allowed if re-written in independent form. Claims 31-38 were allowed.

Claims 1-9

Independent claim 1 is directed to a method of displaying an image on a screen by describing at least a portion of a base image as a path, where the path represents multiple pixels. A non-affine transform is performed on the path instead of the multiple pixels represented by the path to produce a transformed path. The transformed path is then rendered onto a computer screen.

In the Final Office Action, it was asserted that Miller taught the step of performing a non-affine transform on a path because, as claimed, a path merely represented a portion of a base image and Miller showed a step of transforming a collection of points that represent a portion of a base image.

The transform performed in Miller is performed at step 380 of FIG. 3, where image points from on axial direction are registered with image points from another axial direction. Note, each point in the image is transformed separately. Thus, a separate transform operation must be performed for each point.

As amended, claim 1 makes it clear that transforming a path does not involve performing separate transform operations on each pixel represented by the path. Instead, a single transform is performed on the path instead of the pixels. As noted in Applicant's earlier response, performing a single transform on the path instead of performing multiple transforms on each pixel improves the efficiency of the transform.

Miller simply does not show a step of transforming a path instead of the pixels represented by the path. As such, claims 1-9 are patentably distinct from Miller.

Claim 2

Claim 2 depends from claim 1 and includes a further limitation wherein the non-affine transform is a bilinear transform. In rejecting claim 2, the Office Action asserted that col. 3, lines 32-67 of Miller show a bilinear transform. Applicants respectfully dispute this assertion.

Although the cited section discusses linear mapping methods, it does not discuss bilinear transformations. In the present specification, a bilinear transform is defined as a transform that would cause a square box in the base image to be transformed into a quadrilateral.

Miller does not describe or suggest such a transform. As such, it does not anticipate claim 2.

Claims 3-6, 8

The Office Action rejected claims 3-6 and 8 by asserting that col. 1, lines 50-67; and col. 20, lines 38-67 of Miller show a step of describing a portion of a base image using a function of order n and 2n. Applicants respectfully dispute this assertion.

The first cited section discusses background art relating to brain imaging. In this prior art, a number of points, N, are mapped from one image to another image.

Thus, a portion of the base image is not being described as a function of order n but instead simply has N points. As those skilled in the art recognize, a function of order n means that at least one variable is taken to the n^{th} power in the function. The first cited section in Miller does not show such a function.

The second cited section discusses a fast method for landmark deformations given small numbers of landmarks. As with the first cited section, the reference to N in this section represents the number of points to be mapped.

Because Miller describes N as the number of points to be mapped and the present specification and claims refer to n and 2n as the order of some function, Miller does not anticipate claims 3-6 and 8. As such, claims 3-6 and 8 are patentable over Miller.

Claims 5-7

In the Office Action, claims 5-7 were rejected by asserting that col. 9, lines 40-67; col. 10; and Figs. 3-8 of Miller show describing a portion of a base image as a function of order one and three and a non-affine transform comprising performing a perspective transform. Applicants respectfully dispute these assertions.

The cited section of Miller does not describe a portion of the base image as a function of order one or three. It does mention that points along curves, surfaces and volumes may be used to identify a registration transform. However, it never shows an equation that represents these curves, surfaces or volumes. As such, Miller does not show or suggest describing a portion of an image using a function of order one or three.

In addition, Miller does not show or suggest a perspective transform. As found in the present specification, a perspective transform involves transforming a two-dimensional image into a three-dimensional image and then projecting the three-dimensional image onto a two-dimensional surface. Miller never shows or suggests such a transform. Therefore, Miller does not anticipate claims 5-7.

Claim 9

Claim 9 was rejected in the Office Action by asserting that cols. 1, 4, 10 and 11 and Fig. 1 of Miller show the step of approximating the transformed path as a series of lines and rendering each line in the series of lines. Applicants respectfully dispute this assertion.

The cited sections of Miller do not make any mention of approximating an equation or path as a set of lines in order to

render the path. In fact, Miller has no need for such an approximation since it transforms each point in the base image. As a result, the transformed image can be rendered simply by rendering each transformed point.

Because Miller does not show or suggest approximating a path as a set of lines, it does not anticipate claim 9.

Claims 21-26

Independent claim 21 recites a computer-readable medium having computer executable components for performing steps comprising generating a function to describe multiple pixels of an image for a computer screen; transforming the function instead of the multiple pixels using a non-affine transform to produce a transformed function; and converting the transformed function into an image on the computer screen.

As noted above, Miller does not show a step of transforming a function instead of multiple pixels represented by the function. Applicants reiterate that the apparatus described in Miller performs point-to-point transformations from a template image to a target image for the purpose of accurately registering the images. In contrast, claim 21 describes a computer readable medium having components that perform function-to-function transforms.

Because Miller does not transform a function instead of pixels represented by the function, it does not anticipate claim 21 nor claims 22-26, which depend therefrom. As such, claims 21-26 are patentable over Miller.

Claim 22

The Office Action rejected claim 22 by asserting that col. 3, lines 48-67 and Fig. 9 of Miller disclose a smooth curve and the calculation of curvature. The cited section, however, does not disclose representing a portion of a base image as a smooth curve as is found in claim 22. Instead, it discusses the difference between small deformation transforms and large deformation

transforms. In particular, it notes that small deformation transforms are not one-to-one because more than one point in the base image can be mapped to the same point in the target image. Because of this, surface areas, curvatures and tangents cannot be determined using small deformation transforms.

Thus, although Miller includes the word curvature, it does not show or suggest generating a function that represents a smooth curve in a base image as found in claim 22. As such, Miller does not anticipate claim 22.

CONCLUSION

In light of the above remarks, claims 1-30 are patentably distinct from the cited art. Reconsideration and allowance of claims 1-30 is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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MARKED-UP VERSION OF REPLACEMENT CLAIMS

1.(Amended) A method of displaying an image on a computer screen, the method comprising:

describing at least a portion of a base image as a path, the path representing multiple pixels;

performing a non-affine transform on the path instead of the multiple pixels represented by the path to produce a transformed path; and

rendering the transformed path onto the computer screen.

21.(Amended) A computer-readable medium having computer-executable components for performing steps comprising:

generating a function to describe multiple pixels of an image for a computer screen;

transforming the function instead of the multiple pixels using a non-affine transform to produce a transformed function; and

converting the transformed function into an image on the computer screen.